

24. (Twice Amended) A method for performing ophthalmic surgery comprising:

providing a laser having a fundamental ultraviolet wavelength within a range of 193-220 nm exiting from said laser such that said laser emits [outputting] a pulsed laser beam having a repetition rate of [at least 20] 1 Hz to 1000 Hz, and an energy level of no greater than 10 mJ per pulse from [an output coupler of] said laser;

applying said pulsed laser beam onto corneal tissue; and

scanning said pulsed laser beam in a substantially overlapping pattern on said corneal tissue.

Figure 1. Schematic diagram of the experimental setup. The subject is seated in a chair and views the target through a video camera. The target is a light source that is controlled by a computer. The subject's hand is positioned over the target. The distance between the subject's hand and the target is 10 cm. The target is a light source that is controlled by a computer. The subject's hand is positioned over the target. The distance between the subject's hand and the target is 10 cm.

· providing a laser having a fundamental ultraviolet wavelength within a range of 193-220 nm exiting from said laser such that said laser emits [outputting] a pulsed laser beam having a repetition rate of [at least 20] 1 Hz to 1000 Hz, and an energy level of [no greater than] 0.5 to 10 mJ per pulse from [an output coupler of] said laser;

scanning said pulsed laser beam in a substantially overlapping pattern on said corneal tissue.

sub 55
48. (Twice Amended); A method of performing laser ablation on tissue, said method comprising:

providing a laser having a fundamental ultraviolet wavelength within a range of 193-220 nm exiting from said laser such that said laser emits [outputting] a pulsed laser beam having a repetition rate of [at least 20] 1 Hz to 1000Hz, and an energy level of no greater than 10 mJ per pulse from [an output coupler of] said laser;

providing a galvanometer scanner; and

controlling said pulsed output beam with said galvanometer scanner to provide a substantially overlapping pattern of beam pulses on said tissue.

sub 57
69. (Twice Amended) An apparatus for ablating tissue, comprising:
a laser having a fundamental ultraviolet wavelength within a range of 193-220 nm exiting from said laser and adapted to emit a pulsed output beam having [an ultraviolet wavelength and] a repetition rate of [at least 50] 1 Hz to 1000 Hz; and

a scanner constructed and arranged to control said pulsed output beam into a substantially overlapping pattern of beam pulses on said tissue.

sub 512
76. (Twice Amended) An ophthalmic surgery apparatus for performing corneal refractive surgery by reshaping a portion of a corneal surface, said apparatus comprising:

a laser having a fundamental ultraviolet wavelength within a range of 193-220 nm exiting from said laser and adapted to emit a pulsed laser beam having an energy level of less than 10 mJ per pulse from [an output coupler of] said laser; and

a computer-controlled scanning device coupled to said laser to cause overlap of pulses of said pulsed laser beam on said corneal surface to achieve a smooth ablation of corneal tissue.

sub D13
78. (Twice Amended) A method of performing corneal refractive surgery by reshaping a portion of corneal surface, said method comprising:

having a fundamental ultraviolet wavelength within a range of 193-220 nm exiting from said laser;

cl
substantially overlapping a plurality of ultraviolet laser beam pulses over an area of a corneal surface sufficient to ablate a depth of between 0.05 and 0.5 microns of corneal tissue per ultraviolet laser beam pulse;

said laser beam pulses having an energy level of no greater than 10 mJ per pulse from an output coupler of said laser; and

said laser beam pulses having a pulse repetition rate of [at least 50] 1 to 1000 pulses per second.

sub D14
82. (Twice Amended) An ophthalmic surgery apparatus, comprising:
a laser having a fundamental ultraviolet wavelength within a range of 193-220 nm exiting from said laser and adapted to emit a pulsed beam of less than about 10 mJ per pulse [at an output coupler of] from said laser; and

cl
a computer-controlled scanning device coupled to said laser such that pulses of said beam are substantially overlapped to achieve a smooth ablation of corneal tissue.

5045 90. (Twice Amended) A method for performing corneal refractive surgery by reshaping a portion of corneal surface, comprising:

selecting a laser having a fundamental ultraviolet wavelength within a range of 193-220 nm exiting from said laser such that said laser emits a pulsed output beam of ultraviolet wavelength and having an energy level less than 10 mJ/pulse from [an output coupler of] said laser;

selecting a scanning mechanism for scanning said laser output beam;

coupling said laser beam to said scanning mechanism for scanning said laser beam over a predetermined surface;

focusing said scanning laser beam onto said corneal surface;

controlling said scanning mechanism to deliver the scanning laser beam in an overlapping pattern onto a plurality of positions on said corneal surface to at least one of photoablate and photocoagulate corneal tissue; and

removing from 0.05 to 0.5 microns of corneal tissue per pulse overlapped to remove tissue to a desired depth, whereby a patient's vision is corrected by said reshaping of said portion of said corneal surface of said patient's eye.

91. (Twice Amended) A method for performing ophthalmic surgery, comprising:

providing a laser having a fundamental ultraviolet wavelength within a range of 193-220 nm exiting from said laser such that said laser emits a pulsed [pulsing an] ultraviolet laser beam having an output energy level of no greater than 10 mJ/pulse from [an output coupler of] said laser;

applying said pulsing ultraviolet laser beam onto corneal tissue; and

scanning said pulsing laser beam in a purposefully substantially overlapping pattern on said corneal tissue.